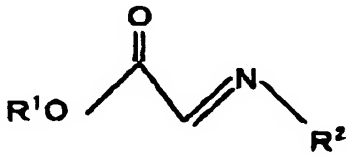
Claims

1. A method of an enantioselective nucleophilic addition reaction of enamide, which is a method of a nucleophilic addition reaction of an enamide compound accompanied by generation of an amino group to an imino group (-CH=N-) of an imine compound, being characterized by allowing the reaction to be performed in the presence of a chiral copper catalyst.

2. The method of the enantioselective nucleophilic addition reaction of enamide according to Claim 1, being characterized in that the chiral copper catalyst is constituted by a copper compound which is a salt of an organic or inorganic acid or a complex or composite of the salt, and a chiral diamine ligand.

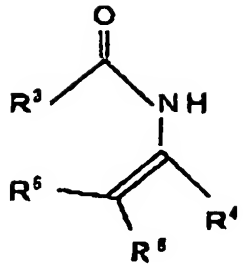
3. The method of the enantioselective nucleophilic addition reaction of enamide according to Claim 2, being characterized in that the chiral diamine ligand has an ethylene diamine structure as a portion thereof.

4. A method for synthesizing an optically active α-amino-γ-imino acid ester, which is the method of the enantioselective nucleophilic addition reaction of enamide according to any one of Claims 1 to 3, being characterized in that the imine compound is represented by the following formula (1):



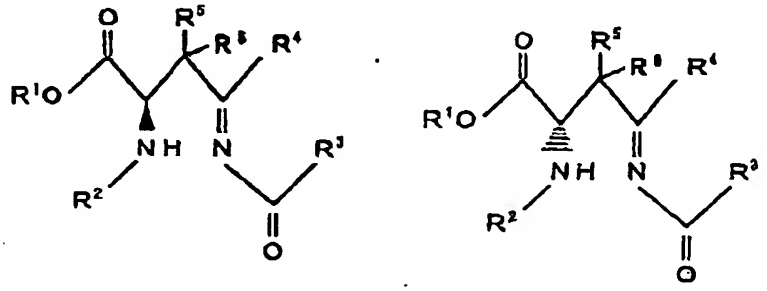
(1)

(wherein R^1 represents a hydrocarbon group which may have a substituent; R^2 represents an R^0-CO- or R^0-O-CO- group, wherein R^0 represents a hydrocarbon group which may have a substituent); and the enamide compound is represented by the following formula (2):



(2)

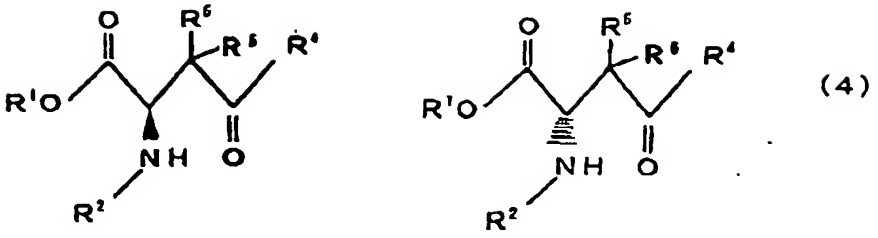
(wherein R^3 represents a hydrocarbon group which may have a substituent or a hydrocarbon group which may have a substituent to be bonded via an oxygen atom; R^4 represents a hydrocarbon group which may have a substituent; and R^5 and R^6 may be same with or different from each other and each represent a hydrogen atom or a hydrocarbon group which may have a substituent, wherein at least one of them represents a hydrogen atom), and generates a compound represented by at least one of the following formulae (3):



(3)

(wherein R^1, R^2, R^3, R^4, R^5 and R^6 each represent same article as described above).

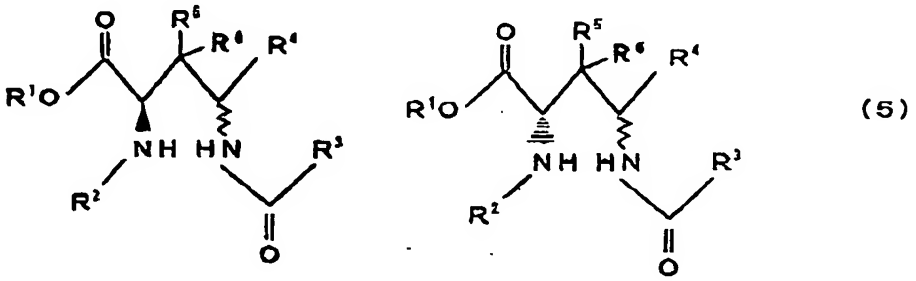
5. A method for synthesizing an optically active α-amino-γ-keto acid ester, being characterized in that, after the nucleophilic addition reaction according to Claim 4, an acid treatment is performed, to thereby generate a compound represented by at least one of the following formulae (4):



(4)

(wherein R^1, R^2, R^4, R^5 and R^6 each represent same article as described above).

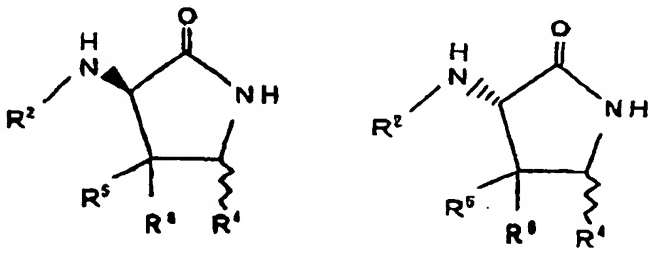
6. A method for synthesizing an optically active α, γ-diamino acid ester, being characterized in that, after the nucleophilic addition reaction according to Claim 4, a reduction treatment is performed, to thereby generate a compound represented by at least one of the following formulae (5):



(5)

(wherein R^1, R^2, R^3, R^4, R^5 and R^6 each represent same article as described above).

7. A method for synthesizing optically active γ-lactams, being characterized in that an acyl group of a γ-amino group of the optically active α, γ-diamino acid ester synthesized by the method according to Claim 6 is removed, to thereby generate a compound represented by at least one of the following formulae (6):



(6)

(wherein R^2, R^4, R^5 and R^6 each represent same article as described above).